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the results of cultures of 1909, marking the beginning of the second decade of the work. In the season covered by the report, 15 species of rusts were each sown on a large number of aecidial hosts with negative results. Sowings of 23 species were made supplementing or confirming previous work of the author and others. Of special interest among these is the sowing of *Calyptospora columnaris* on potted plants of *Abies Fraseri*. The successful culture of the aecidia on *Abies* led to the subsequent discovery of the native aecidial form on *Abies balsamea* in Nova Scotia, whence the original *Calyptospora* material had been obtained. This collection of the aecidia by Professor FRASER is the first from America. Of teleutospore forms connected for the first time with aecidial forms, 6 are reported. These are *Puccinia Ceanothi* (Ellis and Kellerm.) Arth. on *Andropogon Hallii* Hack. and *Ceanothus americanus* L.; *Gymnosporangium exiguum* Kern on *Juniperus virginiana* L. and *Crataegus Pringlei* Sarg.; *G. corniculans* Kern on *J. horizontalis* Moench, *Amelanchier erecta*, and *A. canadensis* (L.) Medic.; and *G. trachysorum* Kern on *J. virginiana* L., *Crataegus punctata* Jacq., *C. coccinea* L., and *C. cernonis* A. Nels.—H. HASSELBRING.

**Rate of photosynthesis.**—THODAY<sup>36</sup> comes to the defense of the increased weight method of SACHS for determining the rate of carbon fixation in green plants. He thinks he has worked out the details of the method so as to insure quantitative accuracy. One cannot see how it will lead to more accurate results than the method described in GANONG's *Plant physiology* (2d ed., pp. 92-97. 1908). In fact, it seems that THODAY's experimental error must be greater than GANONG's, due to the small leaf surface used. We know little about what occurs in a leaf subjected to illumination. As BROWN and ESCOMBE suggest in stating their CO<sub>2</sub> intake method, it may modify the power of various contained compounds to hold water at 100° C. Since the amount of atmospheric CO<sub>2</sub> fixed is the question to be answered, the reliability of the increased weight method must be measured by its agreement with the amount of CO<sub>2</sub> taken up under like conditions. It would seem as though the work better be done on perfecting the CO<sub>2</sub> intake method, if indeed BROWN and ESCOMBE did not leave it so. This method is entirely independent of asymmetry, of variation of surface with insolation, and of translocation and changes in the water-holding powers of the leaf. It also measures directly the thing sought. THODAY depended upon the horn hygroscope as a means of determining the condition of stomata. The results obtained with this instrument are at best only indirect and qualitative, as LLOYD<sup>37</sup> has suggested. The direct and accurate method devised by LLOYD is certainly preferable.—WILLIAM CROCKER.

<sup>36</sup> THODAY, D., Experimental researches on assimilation and respiration in the open air. Proc. Roy. Soc. London B **82**:421-450. 1910.

<sup>37</sup> LLOYD, F. E., Physiology of stomata. Publ. 82, Carnegie Institution. 1908.